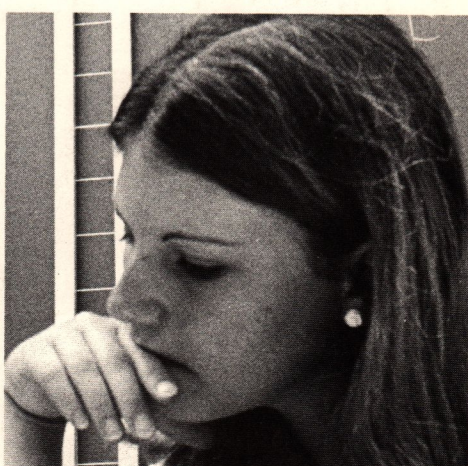
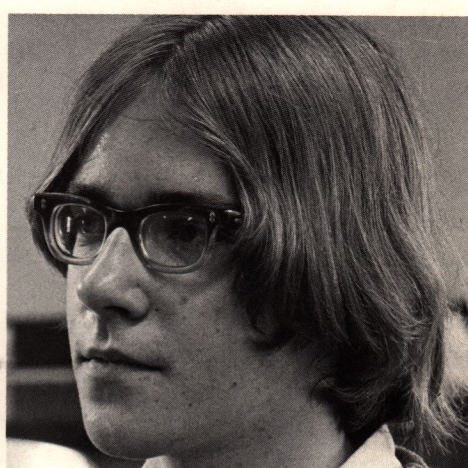
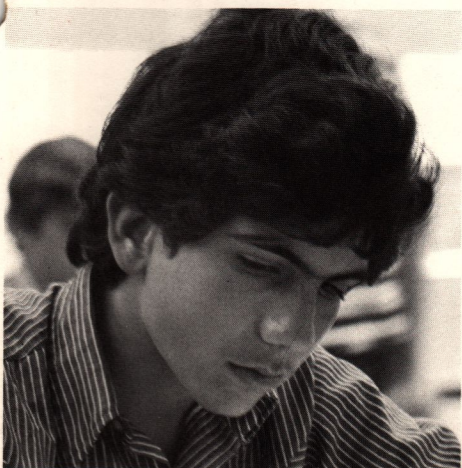
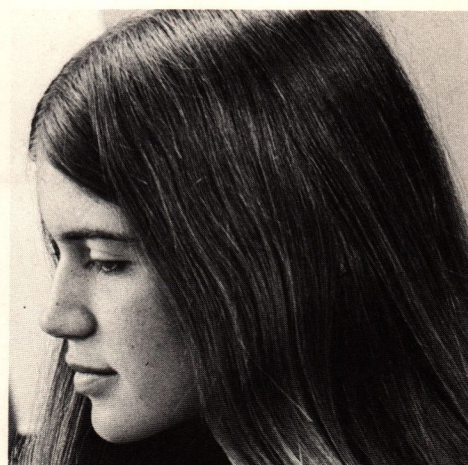
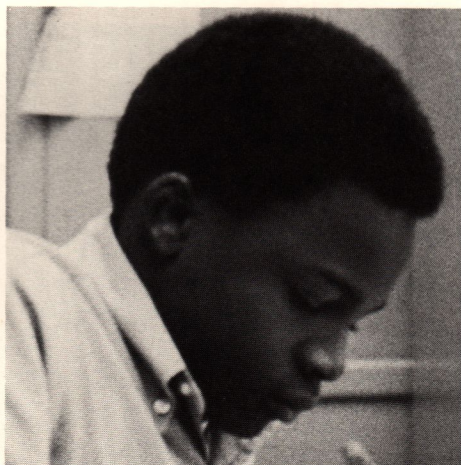
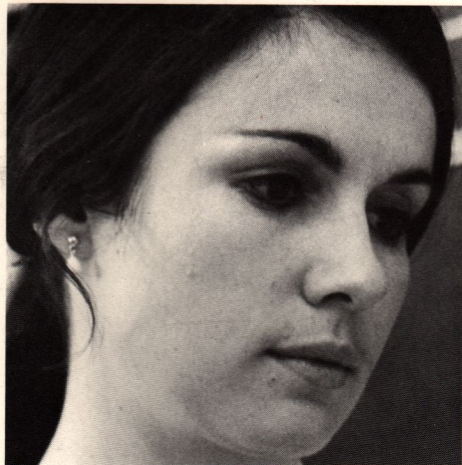
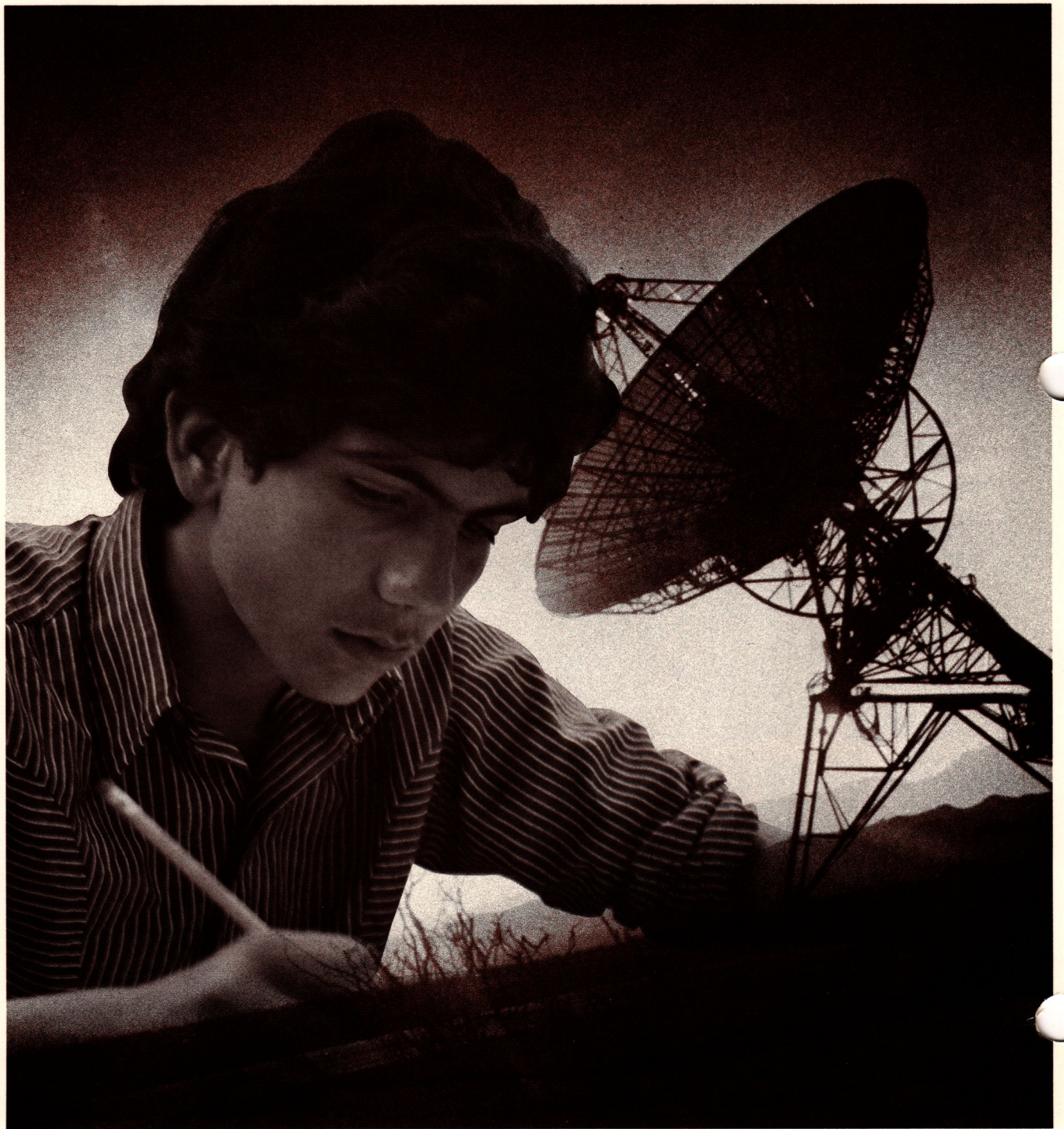


digital

EDUCATION

PRODUCT CATALOG



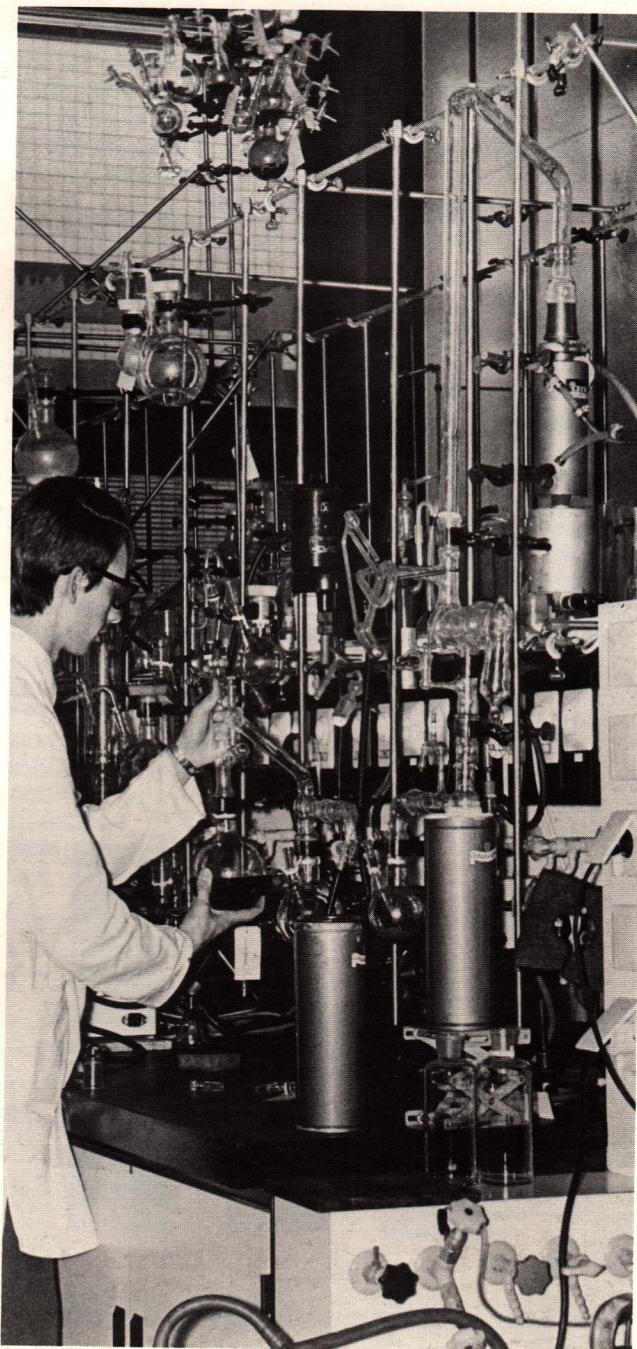


The Challenge of Education in the Computer Age

Twenty years ago the computer was still a novelty, both in our society and in our classrooms. Today it is a reality. Specially designed scientific, commercial, and industrial computing systems have triggered startling advances in research, information handling, and a host of other fields. And now, specially designed school computers are playing an equally vital role in improving the quality of education at all grade levels.

The school computer is a computation resource just as the school library is an information resource. Integrated into the math and science curriculum, the computer is a motivation and reinforcement tool of proven power. Handling all calculations precisely and instantaneously, it frees the student to concentrate on the underlying methods and algorithms. It provides a meaningful laboratory for logical thinking and general problem solving. Used with imagination, the school computer enables students and scholars to deal with realistic, contemporary problems rather than over-simplified models. Not only does it let them do ordinary tasks more easily, it also opens the door to projects and experiments impossible to do by hand.

Today, our lives and our frontiers of knowledge are changing at a rate unimaginable in the pre-computer age. This faster pace demands sharper minds, minds attuned to the potentials (and limitations) of electronic computing. Not just among graduate mathematicians but among all high school and college students. The school computer is the key to giving these students the background they need. It is the key to meeting the challenge of education in the computer age.



EduSystems - School Computers That Meet The Challenge

It takes more than just "hardware" to make an effective school computer system. It takes a thoroughly tested combination of system components and instructional materials designed *specifically for classroom use*. Recognizing this fact, Digital Equipment Corporation has designed a complete line of computer systems tailored to the needs of schools and colleges. Digital's EduSystems are the most complete and powerful line of school computers available anywhere.

EduSystems mean ease of use. They all utilize the well-known computer language BASIC. Programs are simple combinations of English words and decimal numbers. Students with no previous computer experience can be writing meaningful programs after as little as an hour of instruction. Each can take advantage of the complete set of EduSystem manuals, workbooks, and curriculum guides that come with the system.

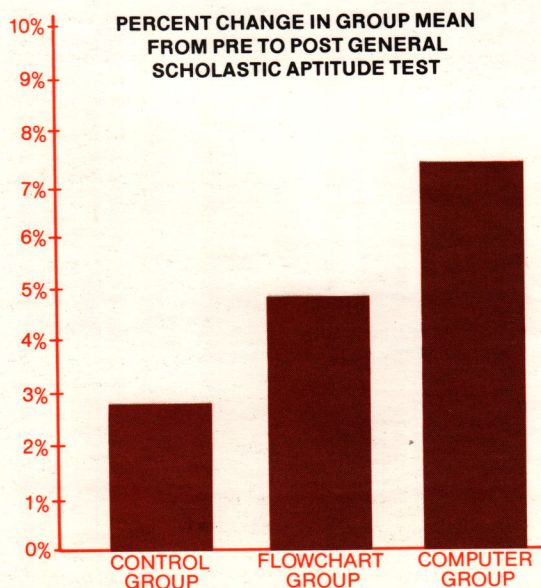
EduSystems mean ease of operation. They are compact, trouble-free, and engineered for use in the busy school environment. Even the biggest can be installed and used right in the classroom. All systems can run completely unattended; no operator is necessary.

EduSystems mean big capacity. Each is designed to handle a large number of student users. Time-sharing allows up to 16 students and teachers to work at the computer simultaneously. Batch processing allows hundreds of student runs per day. And even the smallest starter system handles a hefty student load, day after day.

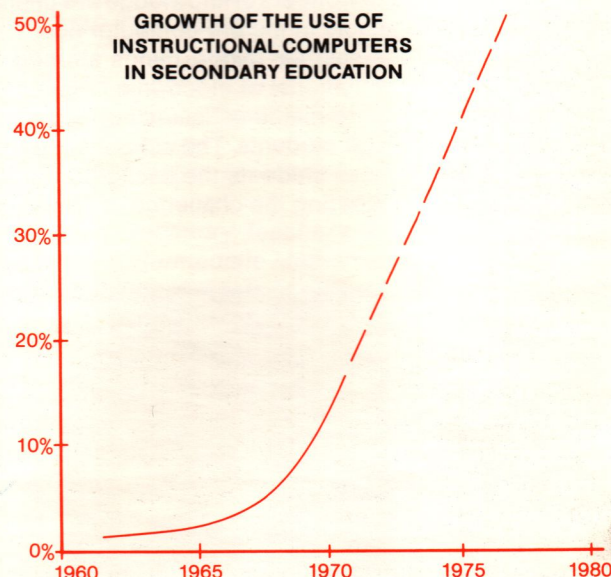
EduSystems mean convenient expansion. Starter Systems grow to be Intermediate Systems. Intermediate Systems grow to be Total Systems. The expansion modules can be installed right at the school. Expandable EduSystems are always the right size to meet a school's present needs. There is never the need to start out with too much computer, or end up with too little.

EduSystems mean power. As the computer expands, so does the BASIC language. Digital's Total Systems offer the most powerful BASIC Language Processors of any computers in their class.

And yet, EduSystems mean economy. These are not big, expensive computers. These are the lowest cost line of school computers available anywhere. They are designed to fully meet the challenge of computer education at a price that is within the reach of every school and college.



SOURCE: Project LOCAL, Inc. Westwood, Massachusetts 1968

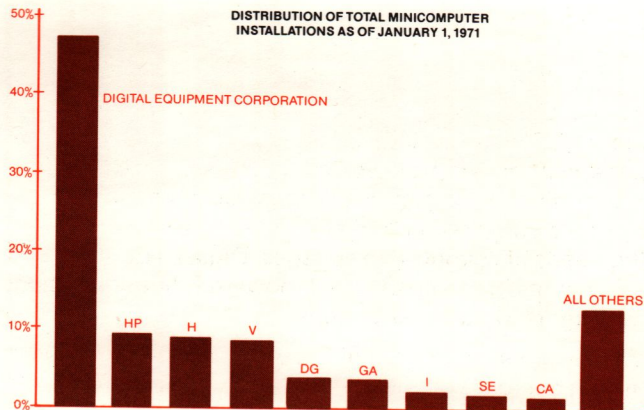


SOURCE: American Institutes for Research, "Survey of Computing Activities in Secondary Schools", 1970.

Digital Equipment Corporation

It is no accident that the best line of school computer systems is also the least expensive. EduSystems are built by Digital Equipment Corporation, the world's leading manufacturer of small computers. Digital invented the small computer and pioneered its development. Installations now number more than 11,000.

This combination of unmatched volume and engineering experience makes DEC the price-performance leader in small computers. But there is more. DEC also has unmatched experience in the field of school computers. In secondary schools alone, our computers have been in classrooms since 1965. Our college and universities experience goes back even farther. Today's line of low-cost EduSystems is a direct result of this vast classroom experience.



SOURCE: EDP Series, "MINICOMPUTERS", Auerbach Technology Evaluation Service





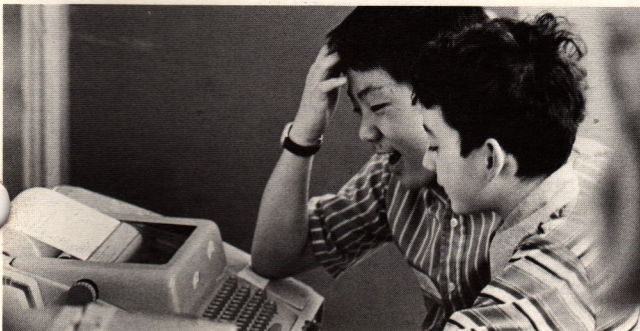
Starter Systems

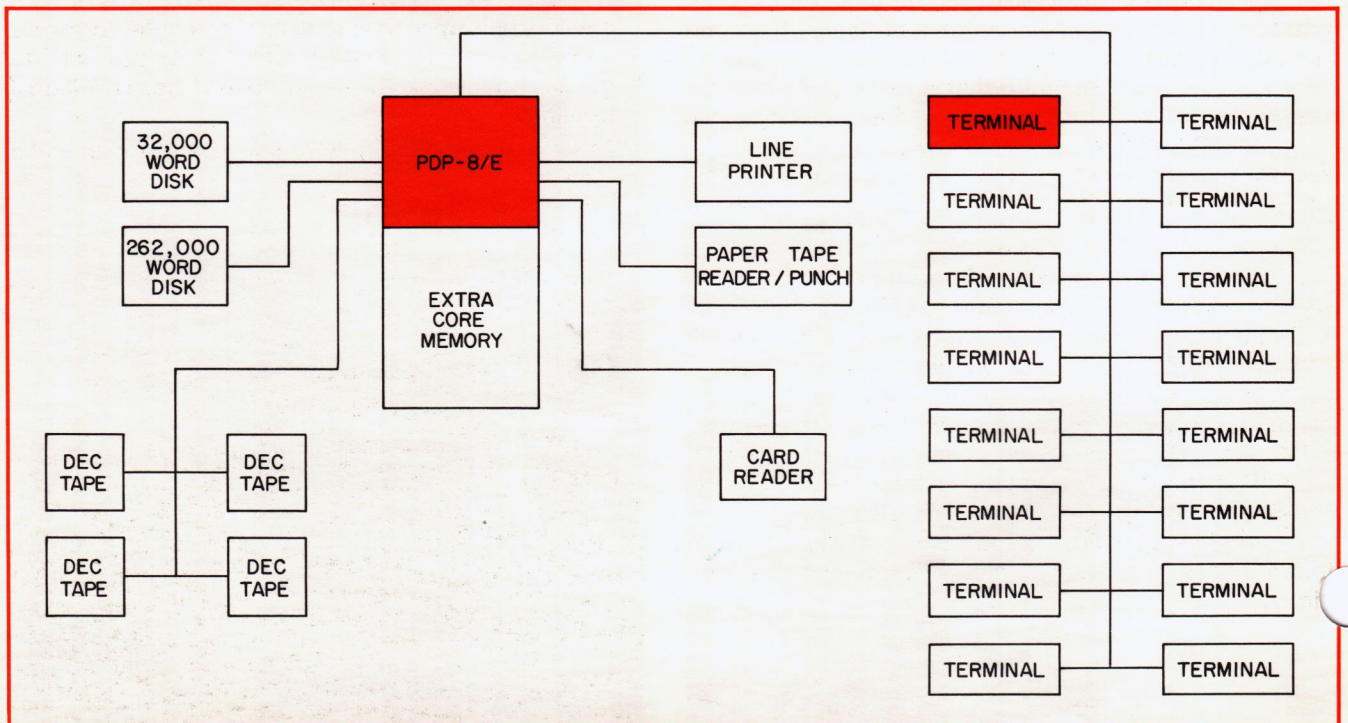
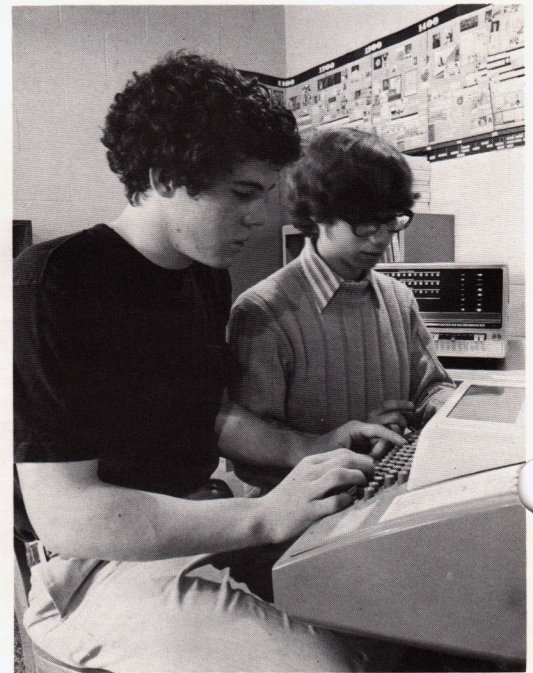
DEC's smallest EduSystems prove that any school can start on a meaningful program of computer education *this year*. They are the lowest cost school computer systems available anywhere. They may be purchased outright, rented, or leased with an option to purchase. Extraordinarily easy to use and operate, they require no previous knowledge of computers. Thus, they are the ideal systems for schools just starting to integrate computers into the curriculum.

Although low in cost, these are complete school computer systems. They are based on a truly general purpose electronic computer, the PDP-8/E. They include all the "software" necessary to operate with the BASIC language. And they also include the complete set of EduSystem manuals, textbooks, overhead projector transparencies, and curriculum guides.

Self-teaching BASIC workbooks let students and teachers learn at their own pace. A complete set of overhead projector transparencies guide classroom instruction in the BASIC language. A variety of textbooks and teacher guides point out the areas to apply EduSystems to the regular mathematics and science curricula. And sets of sample and demonstration programs suggest other possible applications. All together, these system components add up to a school computer that is ready to go to work the day it arrives.

The effectiveness of these smaller EduSystems as classroom tools is well proven. Hundreds of schools have started out with either the EduSystem 10 or the EduSystem 20. Many have since expanded to an Intermediate System, or even the Total System, EduSystem 50. Many others are continuing to support excellent programs of computer education without expanding their facilities at all.





EduSystem 10

EduSystem 10 brings full computer power to schools that used to think only in terms of calculators. EduSystem 10 is simple like a calculator. The computer itself is no bigger than a suitcase. It fits easily onto a cart for mobility and plugs in anywhere there's a wall outlet. EduSystem 10 is inexpensive like a calculator. Compare it in price to a programmable calculator with the hard copy printer required for meaningful classroom work. EduSystem 10 is easy to use like a calculator. It responds instantly to requests for calculations. For example:

PRINT SQR (77)	what you type
8.774964	what EduSystem 10 types

But that is where the comparison ends, because EduSystem 10 is not a calculator. It is a full-scale electronic computer.

EduSystem 10 operates in a real computer language, BASIC. Students do not have to code programs in a minute and often incomprehensible language. BASIC is much easier to learn and use, yet far more powerful. Programs are natural sequences of English words and decimal numbers. The BASIC language is richly supported by textbooks and teacher aids. Students work directly at the machine, getting valuable "hands-on" computer experience. Programs may be run as soon as they are entered. Errors are detected and reported immediately. Corrections may be typed in without having to reenter the entire program. Completed programs may be punched on paper tape for quick reloading at a later date.

EduSystem 10 is a very low-cost computer system that requires no previous knowledge of computers or computer math. EduSystem 10 is an ideal starting point for a school computation resource. More schools have started out with this system than with any other small school computer. But what, more than anything else, makes EduSystem 10 the ideal first system is that it grows. It may at any time be expanded to the higher capacity EduSystem 20, to any of DEC's Intermediate Systems, or even to EduSystem 50, the Total School Computer System. EduSystem 10 is a little school computer with a very big future.

System Components

1. PDP-8/e table-top computer with 4096 words of core memory, power failure protection, automatic loader, and computer terminal with paper tape reader and punch.
2. BASIC Language Processor which includes the following language elements: LET, PRINT, READ, DATA, GOTO, IF, FOR, NEXT, GOSUB, RETURN, INPUT, REM, RESTORE, DEF, DIM, STOP, END, LIST, RUN, SCRATCH and the nine standard functions.
3. Library of sample programs, textbooks, and curriculum guides.

Optical Components

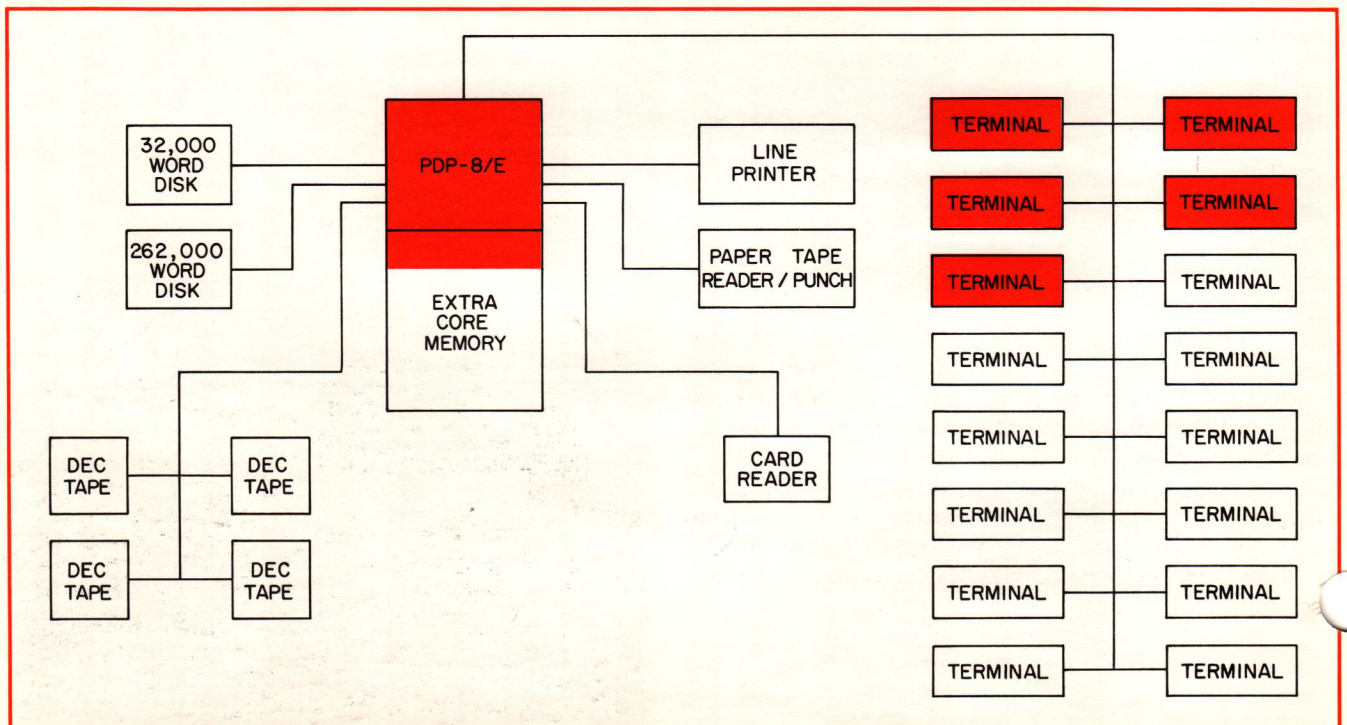
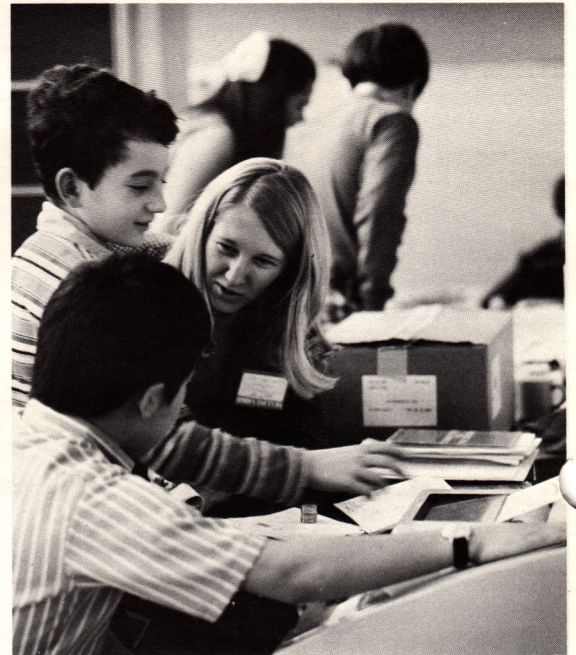
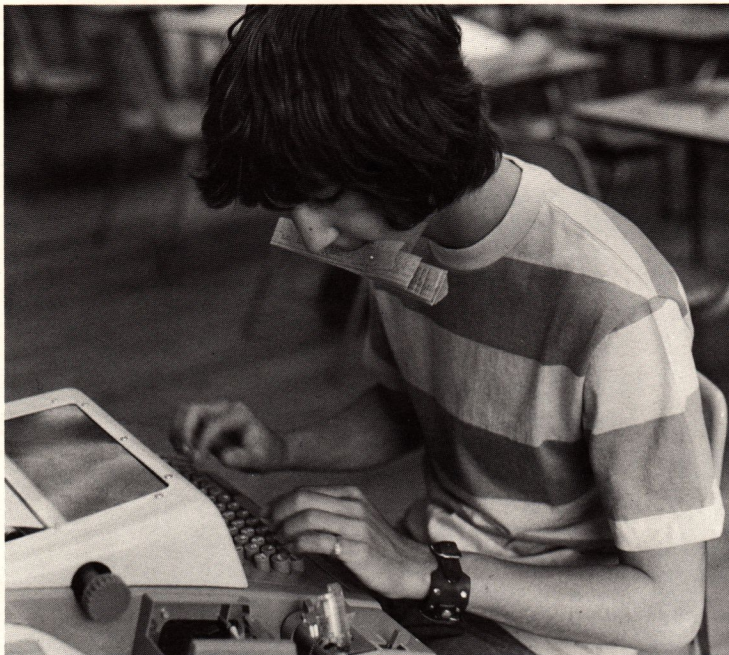
1. Second, "off-line", computer terminal with paper tape reader and punch. This off-line terminal allows students to prepare paper tapes of their programs before coming to the computer, thus increasing the number of students who can use the computer per day.
2. High-speed paper tape reader which facilitates the use of other system capabilities, such as FOCAL, FORTRAN, and assembly language.

System Expansion

1. To expand to EduSystem 20, add 4096 words of core memory plus up to four additional computer terminals and their associated "interfaces." An EduSystem 10 off-line terminal may be used as one of these additional terminals.
2. To expand to EduSystem 30, add one DECdisk and a mark sense card reader.

Environmental Requirements None





EduSystem 20

The ideal first computer system for the larger school or school system, EduSystem 20 is a complete, self-contained time-sharing system which allows up to five students and teachers to work simultaneously, but independently. Each works at his own terminal, without interference from others. Having an EduSystem 20 is comparable to having five EduSystem 10's, only much less expensive.

The much greater capacity of the system means much wider computer usage. With five simultaneous users, it becomes feasible to use the computer in all math classes, rather than just the more advanced ones. It also becomes possible to use the computer in other departments. One, or more, terminals may be reserved for science students, or even for work in the social sciences. EduSystem 20 computer terminals need not be located in the same room as the computer itself. They may be located in different buildings, connecting to the computer by regular telephone lines. A single EduSystem 20 may serve a whole school system, or be shared by neighboring school systems.

EduSystem 20 not only handles more users, it handles more sophisticated problems as well. Advanced BASIC features such as ON . . . GOTO and TAB allow more complex programs. In addition, the system may be adjusted to handle longer programs by lowering the number of simultaneous users. EduSystem 20 may, for example, be run for five users during the regular school day, then cut back to two or three after school. Users may then run programs which are twice as long. Or the system as a whole may be expanded (by adding core memory) so that all five users may run longer programs.

Five simultaneous users, more sophisticated and longer programs, yet true ease of use, these are the features that make EduSystem 20 the ideal big school starter system. Like EduSystem 10, it is a complete full-scale computer system. It is easily expandable to the intermediate EduSystem 40, or to the Total School Computer, EduSystem 50. Or it can continue to be used as EduSystem 20. With five simultaneous users, EduSystem 20 is the starter system that already has the big capacity schools need.

System Components

1. PDP-8/e table-top computer with 8192 words of core memory, power failure protection, automatic loader, and up to five computer terminals and their associated interfacing.
2. Time-shared BASIC Language Processor which includes the language elements of EduSystem 10 plus the following: ON-GOTO, BYE, EDIT, KEY, TAPE and TAB.
3. Library of sample programs, textbooks, and curriculum guides.

Optional Components

1. Additional core memory, in units of 4096 words, to increase program size. Fully expanded systems allow programs of up to 300 lines.
2. One or more "off-line" terminals for paper tape preparation.

System Expansion

To expand to EduSystem 40, add one DECdisk and a mark sense card reader.

Environmental Requirements None



STATEMENT		EDUSYSTEM-30		BATCH BASIC	
0	0	PRINT	REM		
1	1	LET	IF		
2	2	FOR	NEXT		
3	3	READ	DATA		
4	4	GO SUB	RETURN		
5	5	GOTO	DEF		
6	6	INPUT	DIM		
7	7	WRITE	RESTORE		
8	8	CHAIN	STOP		
9	9	END	RANDOM		

digital
EDUSYSTEM TEST SCORING ANSWER CARD

STUDENT NUMBER	STUDENT NUMBER	STUDENT NUMBER	STUDENT NUMBER
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

MARK

NAME _____ DATE _____
 INSTRUCTOR _____
 COURSE _____

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EDUSYSTEM-30
BASIC TEMPLATE

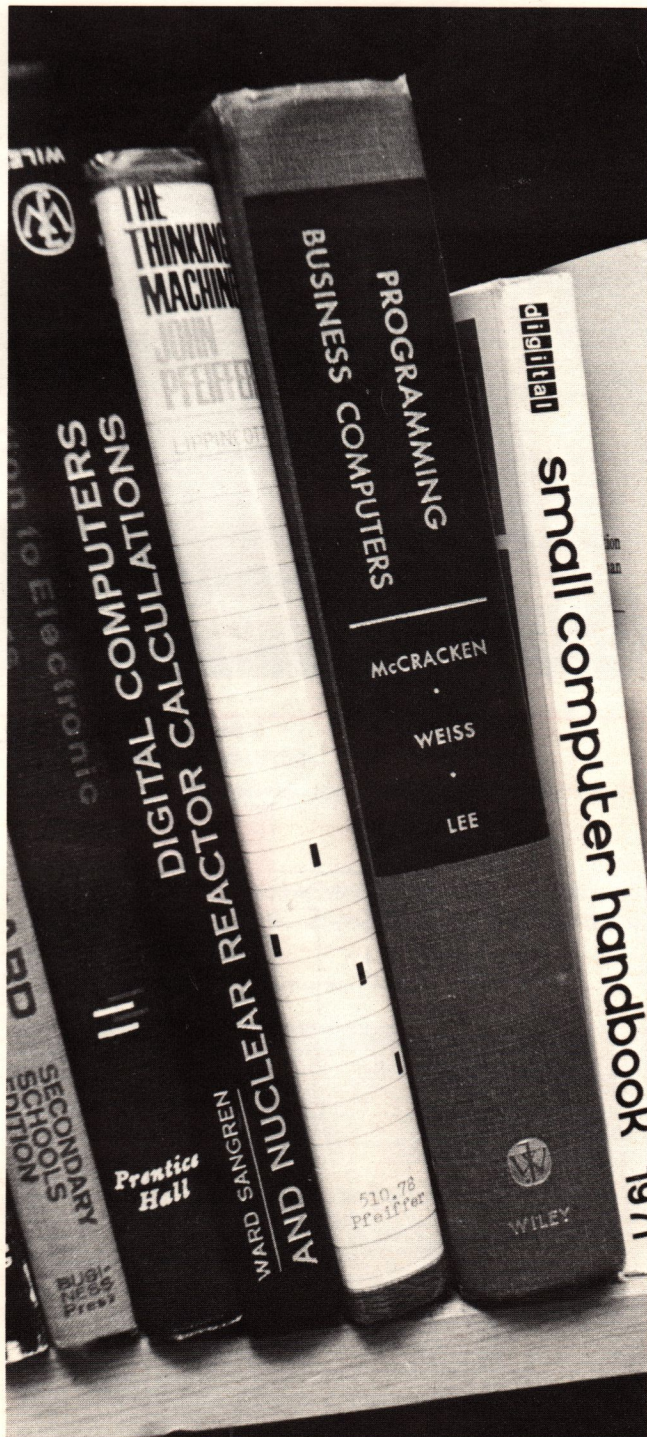
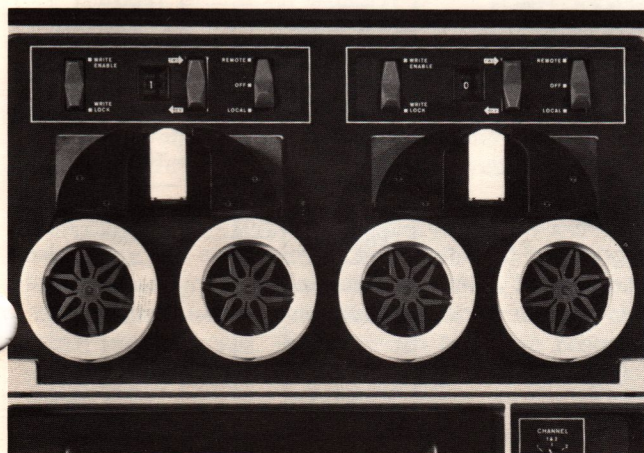
digital
 Maynard, Massachusetts

Intermediate Systems

DEC's Intermediate EduSystems prove that fast-expanding computer needs don't require fast-expanding computer budgets.

Schools that start out using the computer just with higher level math courses soon find many other equally important applications. All math students can, and should, be introduced to the computer. But this means a much greater load on the system. And, as the number of student and faculty users goes up, the sophistication of these users also increases. Students in their second and third years with the computer begin to write longer and more complex programs. They need a more sophisticated computer system to meet their needs. Meanwhile other departments expand their use of the computer. And, finally, there may be the need to do administrative tasks, such as student record keeping and test grading, on the computer.

The Intermediate EduSystems are specifically designed to handle these expanding, and diverging, computer needs. They do so by adding faster "peripheral" devices such as card readers, disk storage, and tape storage units. The card reader allows much faster loading of programs. Disk storage allows the use of a more sophisticated BASIC Language Processor as well as storage for longer programs. The tape units permit a true computer "Operating System" and make possible the storage of large files of information. These are the components needed to do more different tasks for more different users. With DEC's Intermediate School Computers, a slightly expanded system means greatly expanded capacity.



EduSystem 30

EduSystem 30 is the computer system that offers the lowest cost per student served of any DEC EduSystem. EduSystem 30 is specifically designed to handle a very high volume of student programs. It can easily process four to five hundred student programs per day.

With hundreds of students preparing programs every day, a fast, convenient way to do it is needed. EduSystem 30 is the answer. It allows users to prepare their programs on specially formatted optical mark cards. The unique EduSystem 30 card-making template makes card preparation fast and error-free. Cards are marked with an ordinary pencil; no special equipment is needed. Students can write their programs at home, or right in the classroom.

When hundreds of students are submitting programs every day, the computer must be able to process them efficiently. EduSystem 30 runs programs in batches, not just one at a time. It reads in a program, executes it, produces the output, then automatically goes on to the next. EduSystem 30 is a true batch operating system. Operation can be unattended. The system automatically terminates programs with errors, or programs which run too long. This automatic batch operation assures maximum system efficiency. And students who submit programs don't need to know anything about the actual operation of the computer equipment.

When teachers are assigning hundreds of student programming tasks, the administration of the computer must be effective. EduSystem 30 keeps a "log" of all programs it runs. This log sheet provides teachers with an exact record of how their students are using the computer. EduSystem 30 also provides a unique capability for automatic testing (and grading) of student programs. Teachers can write programs which test the correctness of the programs their students write. In programming classes, where teachers assign the same programming exercises to many students, automatic grading is a necessity.

With hundreds of students making use of the computer every day, the system must be capable of handling all levels of expertise. A unique EduSystem 30 capability allows it to be used by students who know nothing at all about programming. Teachers can pre-store programs within the computer for use by beginning students. A single card "calls out" these programs. All the student has to do is mark his data on cards and submit it to the computer.

EduSystem 30 also has powerful programming features for advanced student programmers. String variables, program chaining, and disk data files. And it may be used interactively when batch processing is not in progress.

EduSystem 30 does all these things for hundreds of students every day. It is the ideal system for providing an organized, effective program of computer education that is truly school-wide.

System Components

1. PDP-8/e computer with 4096 words of core memory, power fail protection, automatic loader, 32,000 word DECdisk, (or dual DECtape), combined optical mark and punch card reader, and computer terminal with paper tape reader and punch.
2. Batch BASIC Language Processor which includes the language capabilities of EduSystem 10 plus the following: CHAIN, WRITE, SAVE, UNSAVE, CATALOG, TAPE, ECHO, NEW, OLD, LENGTH, and RESEQUENCE. The batch processing system includes a complete set of operating commands and capabilities.
3. Library of sample programs, textbooks, and curriculum guides.

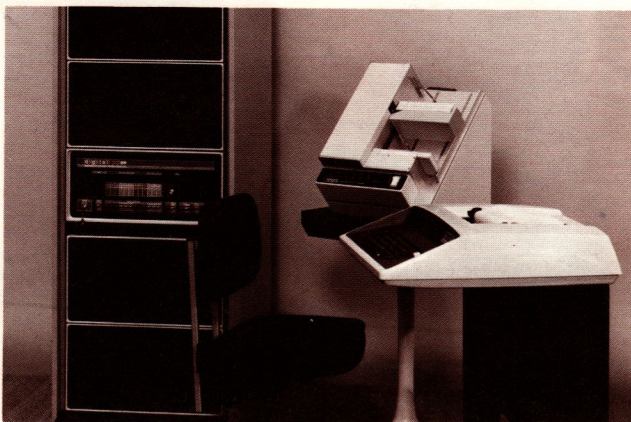
Optional Components

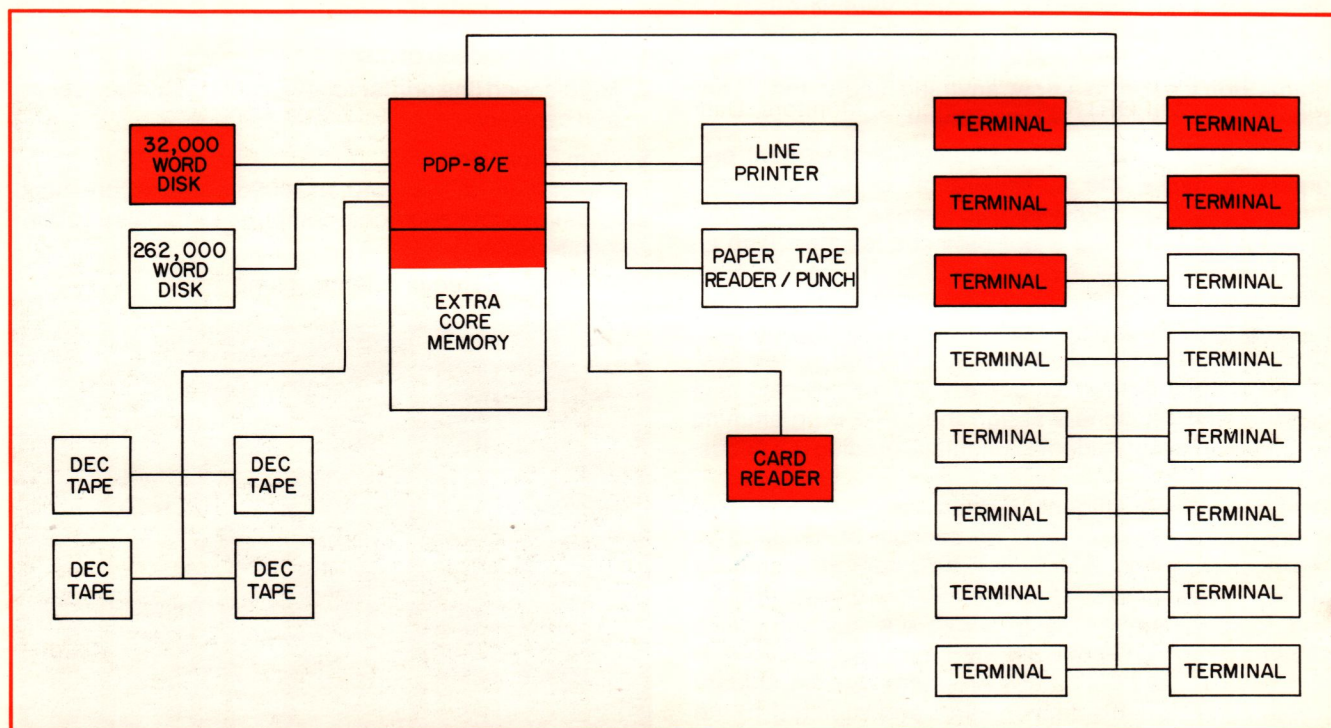
1. DECtape instead of disk.
2. High-speed line printer for even greater system speed and capacity.

System Expansion

To expand to EduSystem 40, add 4096 words of core memory plus up to four additional computer terminals and their associated interfaces.

Environmental Requirements None





EduSystem 40

EduSystem 40 offers a real solution to "We have 300 students, in our program at the high school, and we'd like to offer some computing power to our three junior highs." EduSystem 40 combines the high through-put batch processing of marked cards to handle the high schools's large volume and can be switched, in less than two minutes, into a five terminal time-sharing system.

The senior/junior high example could easily be solved with an EduSystem 40 in the senior high school (marked card reader and two teleprinters) and a telephone-connected remote teleprinter in each of the three junior highs. For a "shared" environment such as this, or as the dedicated installation in a large school, EduSystem-40 combines the best of EduSystem 20's interactive terminals, with the massive throughput of EduSystem 30's batch BASIC.

EduSystem 40 is an excellent system to build around the optional DECTape mass storage. A reel of DECTape is easily affordable by any programming student, and its 370,000 characters of storage space will allow him to keep an entire years programming development on his one reel and in his pocket.

EduSystem 40, when built around DECTape includes PS-8, the Programming System on the 8. PS-8 opens the whole world of FORTRAN, Assemblers, Monitors, Data Processing, mass storage, system devices, device independence and true program development to the always present and eager computerniks. EduSystem 40 and DECTape make an unprecedented combination for those beginning a computer science program, where active study of the computer itself will be carried out.



System Components

1. PDP-8/e with 8192 words of core memory, power fail protection, automatic loader, 32,000 word DECdisk (or dual DECTape), mark sense card reader, and up to five computer terminals.
2. Batch BASIC Language Processor as supplied with EduSystem 30.
3. Time-shared BASIC Language Processor as supplied with EduSystem 20.
4. Library of sample programs, textbooks, and curriculum guides.

Optional Components

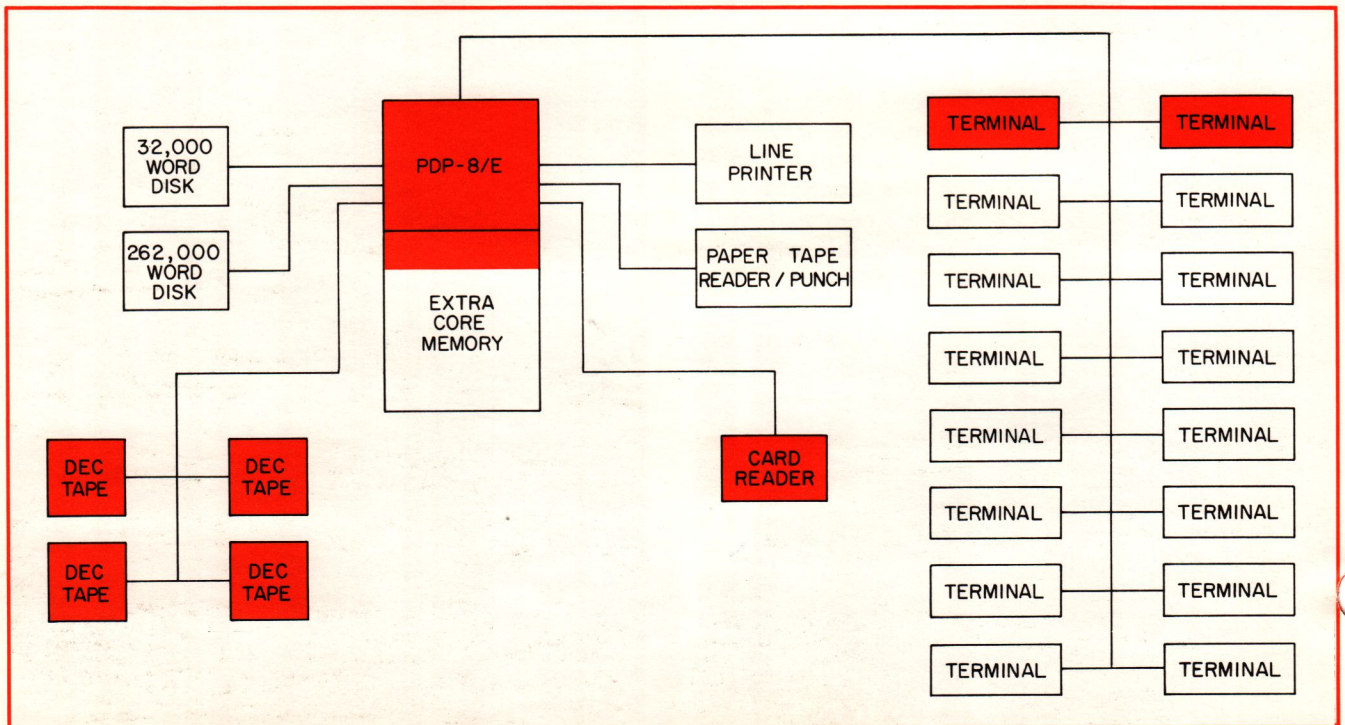
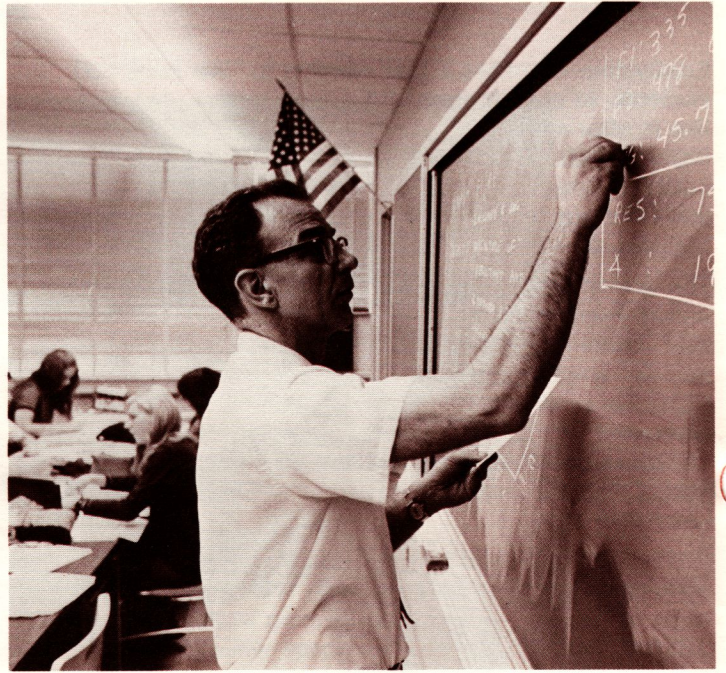
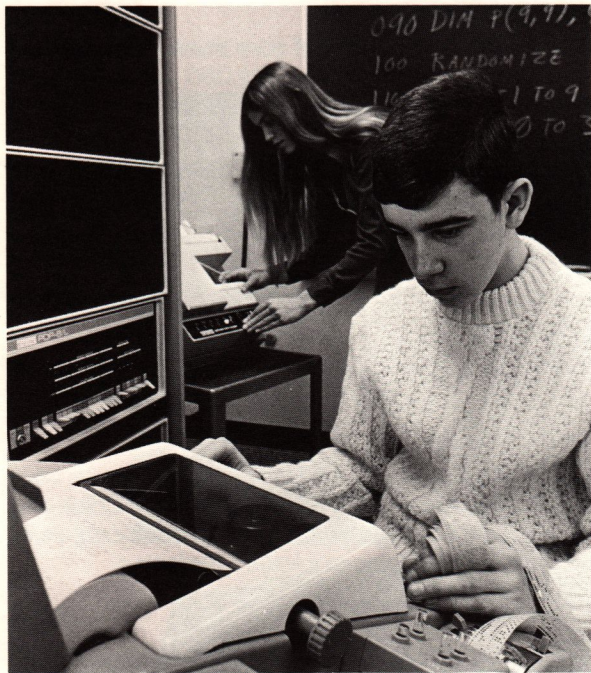
1. High-speed line printer for much faster output.

System Expansion

To expand to EduSystem 50, add 4096 words of core memory, paper tape reader, 262,000 word DECdisk and control, EduSystem 50 software set, and additional computer terminals and their associated interfacing.

Environmental Requirements None





EduSystem 40/EDP

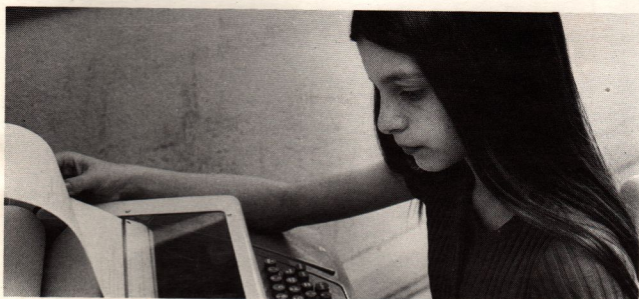
EduSystem 40/EDP is the lowest cost, school-wide computer system available anywhere. Because it combines interactive time-sharing, high-speed batch processing, and the capacity for administrative data processing, EduSystem 40 is the ideal system for the experienced school with a wide variety of computer needs.

Unique system components give the system its remarkable price-performance ratio. EduSystem 40/EDP includes four DECtape magnetic tape units, each capable of storing almost four hundred thousand characters of school records. DECtapes are small, inexpensive, and virtually indestructible—the ideal medium for storing large files of information. Another unique component is the high-speed DECwriter for fast printing of reports. The DECwriter operates at three times the speed of conventional computer terminals, yet is quieter than an electric typewriter. Finally, there is the 300 cards per minute card reader which is capable of reading both punched and pencil-marked cards.

Complete software packages support the EduSystem 40/EDP. EduSystem 20 BASIC time-sharing and EduSystem 30 BASIC batch processing are both included. School record keeping systems are available to create, maintain, and list master files of student, staff and/or inventory records. Attendance, grade reporting, and course requests are all handled by standard packages that are available with EduSystem 40/EDP.

In addition there is a FORTRAN operating system, PS/8. PS/8 controls the creation, compilation, and execution of large FORTRAN programs. These FORTRAN programs may then access files mounted on any of the four system tape transports.

Three modes of operation, three sets of operating software, for three different school needs. That's EduSystem 40/EDP.



System Components

1. PDP-8/e with 12,288 words of core memory, power fail protection, automatic loader, two dual DECtape units and controller, mark sense card reader, computer terminal, and DECwriter.
2. Batch BASIC Language Processor as supplied with EduSystem 30.
3. Time-shared BASIC Language Processor as supplied with EduSystem 20.
4. PS/8 programming monitor system with FORTRAN compiler, editor, assembler, and complete set of utility routines.
5. Library of sample programs, textbooks, and curriculum guides.

Optional Components

1. High-speed line printer for much faster output.

System Expansion

To expand to EduSystem 50, 4096 words of core memory, paper tape reader, 262,000 word DECdisk and control, EduSystem 50 software set, and additional computer terminals and their associated interfacing.

Environmental Requirements None





Total Systems

DEC's most powerful EduSystems prove that a total school computing system is within the range of most school budgets. These are fully-expanded, no-compromise school computers. They do student problem solving, science simulations, social science data reduction, business education, and administrative data processing. Yet these extraordinary systems cost as little as \$1260 a month.

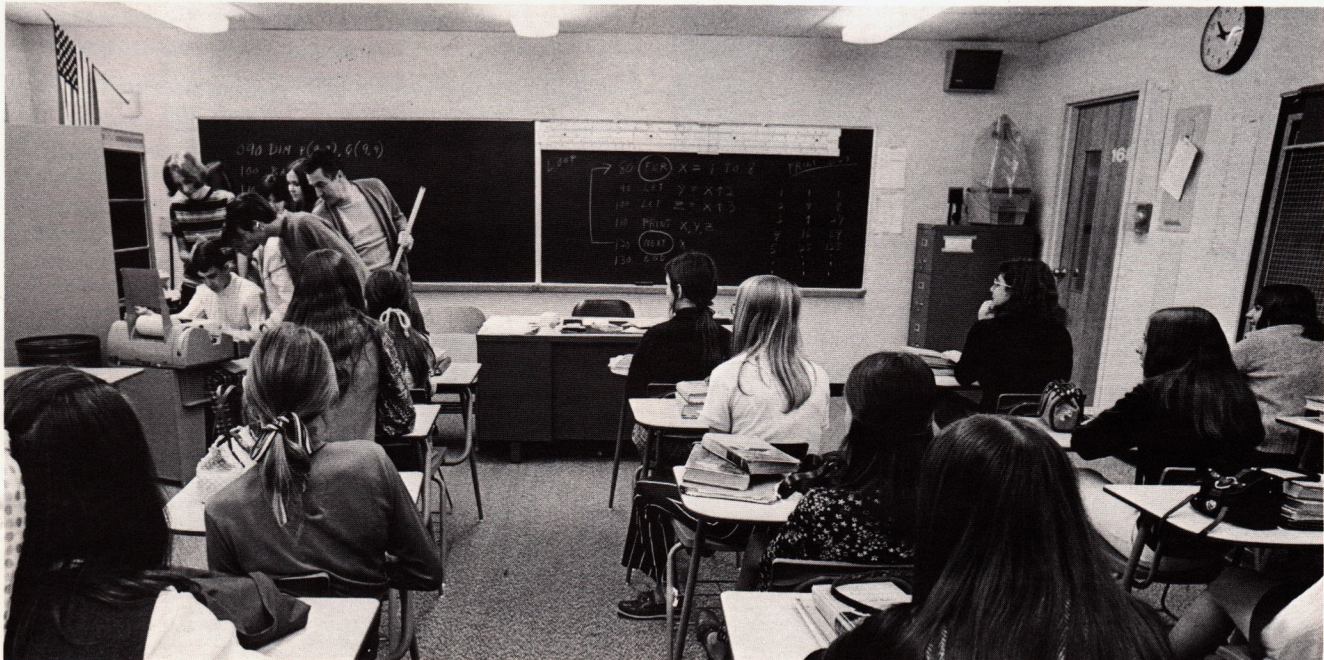
Total Systems mean total service to all school users all day long. Not mornings for student work and afternoons for data processing. Or an hour a day for each school department. But *full* service to all school users simultaneously. These are time-sharing systems. Up to 16 users each have full use of the computer, independently, but simultaneously. Terminals may be spread throughout the school for ease of access. All users work interactively, communicating directly with the computer. The decisive advantages of this interactive capability for effective student instruction has been proven again and again.

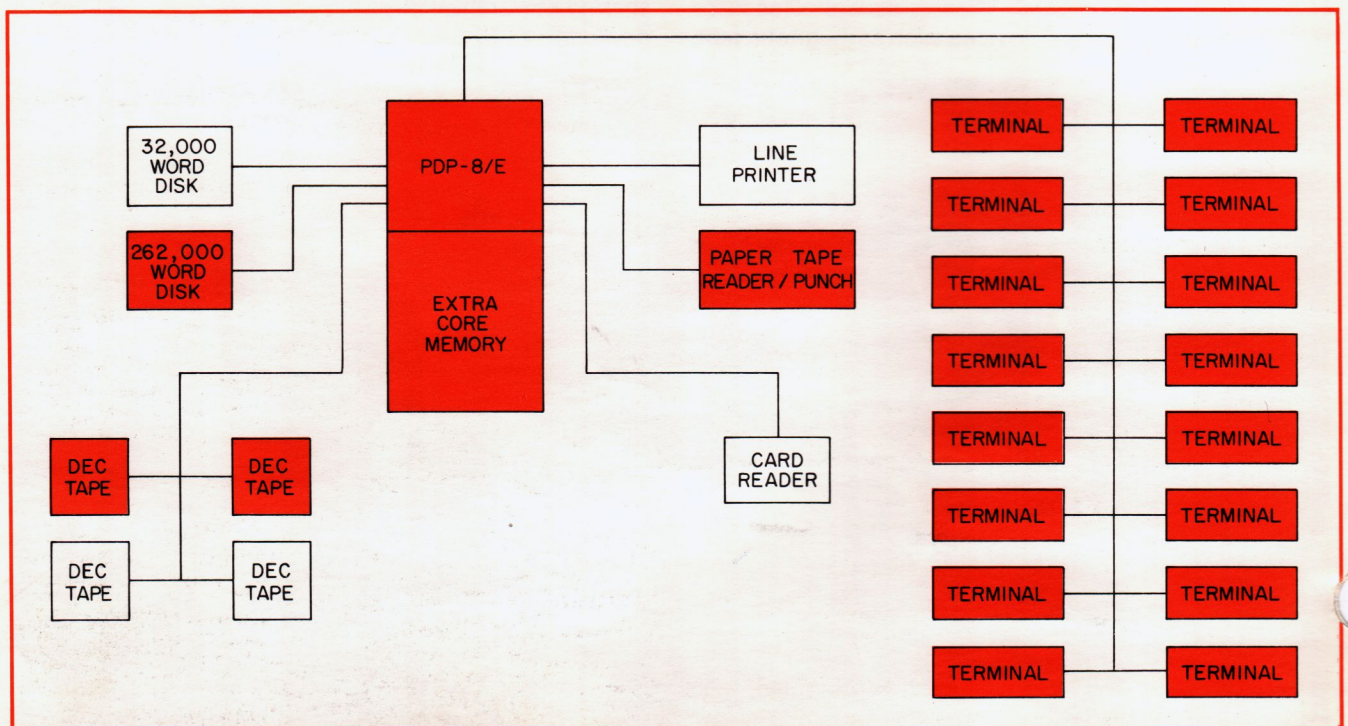
But there is a big difference between conventional time-sharing and DEC's Total School Computers. EduSystem's 50 and 80 provide resource sharing as well. Resource sharing means peripheral devices such as magnetic tape

units and line printers are available *while the computer is time-sharing*. Conventional time-sharing allows multiple users to do interactive problem solving. But when it is time to do tasks such as administrative data processing (which need tape files and line printers) time-sharing must be stopped. It is a needless "either/or" that cripples effective utilization of the school computer. Only resource sharing lets these two activities (and many others besides) go on simultaneously, all day long.

Resource sharing also means efficient management of the program and data libraries built up by the system's users. All this information is organized and stored on low-cost, fool-proof DECTape reels. There is never the need for big bins of messy, easily destroyed paper tapes. (Each DECTape holds *half a mile* of paper tape.) And because information on DECTape can be loaded in seconds, only the programs actually being used need to be loaded. Thus, resource sharing keeps the need for expensive disk storage to a minimum.

Powerful. That's the word for DEC's Total Systems. Language power to meet the needs of the most sophisticated BASIC programmers. Time-sharing power to handle the whole school's needs simultaneously. And resource sharing power that keeps the whole computer at work all day long.





EduSystem 50

The most versatile school computer available anywhere. EduSystem 50 is a truly general-purpose time-sharing system with multiple languages and resource sharing. It is the ideal system for schools that offer both beginning and advanced computer courses.

Beginning students use EduSystem 50's extended version of BASIC. But this is not a language just for beginners. EduSystem 50 BASIC is a big job language that includes strings, files, and program chaining. Data files may be on either disk or DECtape and may contain up to 350,000 characters each. Direct access to tape files means that large files never have to be loaded onto the disk. Because they are removable, DECtapes are ideal for the storage of administrative files. The optional BASIC line printer capability provides further capacity for data processing.

Advanced students and computer science classes use the EduSystem 50 assembly language package. Because it is very close to actual machine language, assembly language is ideal for studying about computers themselves. All elements of the package—editor, assembler, loader, and debugging utility—are available for on-line terminal use. EduSystem 50 assembly language is not a simulator package. The system provides direct hardware execution of assembled programs under time-sharing. This means that students get real first-hand experience with binary arithmetic, input/output, techniques of file organization, and even with compiler techniques.

Three more higher level languages, FORTRAN-D, FOCAL, and ALGOL*, supplement the BASIC and assembler languages. Utility programs provide rapid transfer of programs to DECtape or paper tape and report on system status.

All languages and utilities may be in use simultaneously. One group of users may be working in BASIC while another is using assembly language. With EduSystem 50, it is never necessary to shut off time-sharing when one or more students need access to a language other than BASIC. EduSystem 50 serves all levels of users, simultaneously.

System Components

1. PDP-8/e computer with 20,480 words of core memory, power fail protection, automatic loader, paper tape reader/punch, 262,000 word high-speed disk, dual DECtape transports and controller, and 16 computer terminals with their associated interfaces.*
2. General-purpose time-sharing Monitor system.
3. Time-shared BASIC Language Processor which includes all language elements of EduSystem 20 plus the following: SAVE, UNSAVE, REPLACE, CATALOG, OLD, CHR, COMPILE, CHANGE, RECORD, OPEN, GET, PUT, CLOSE, LPRINT, LINPUT, CHAIN, SLEEP, and string variables.
4. Time-shared Assembly Language Package including text editor, symbolic assembler, loader, and utility debugging program.
5. Time-shared FORTRAN-D and FOCAL Language Processors plus system utility programs.
6. Library of sample programs, textbooks, and curriculum guides.

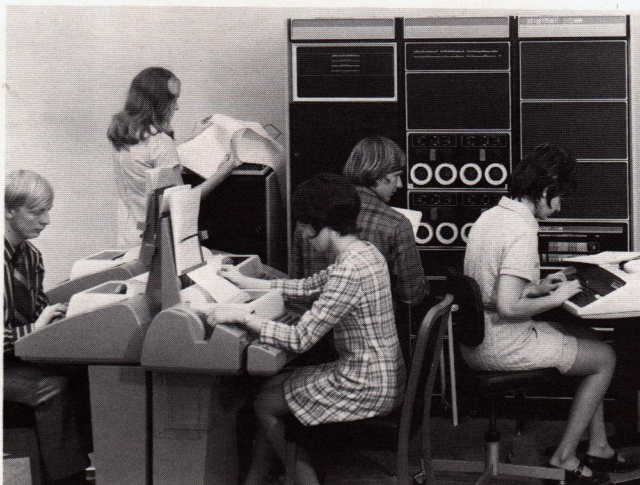
Optional Components

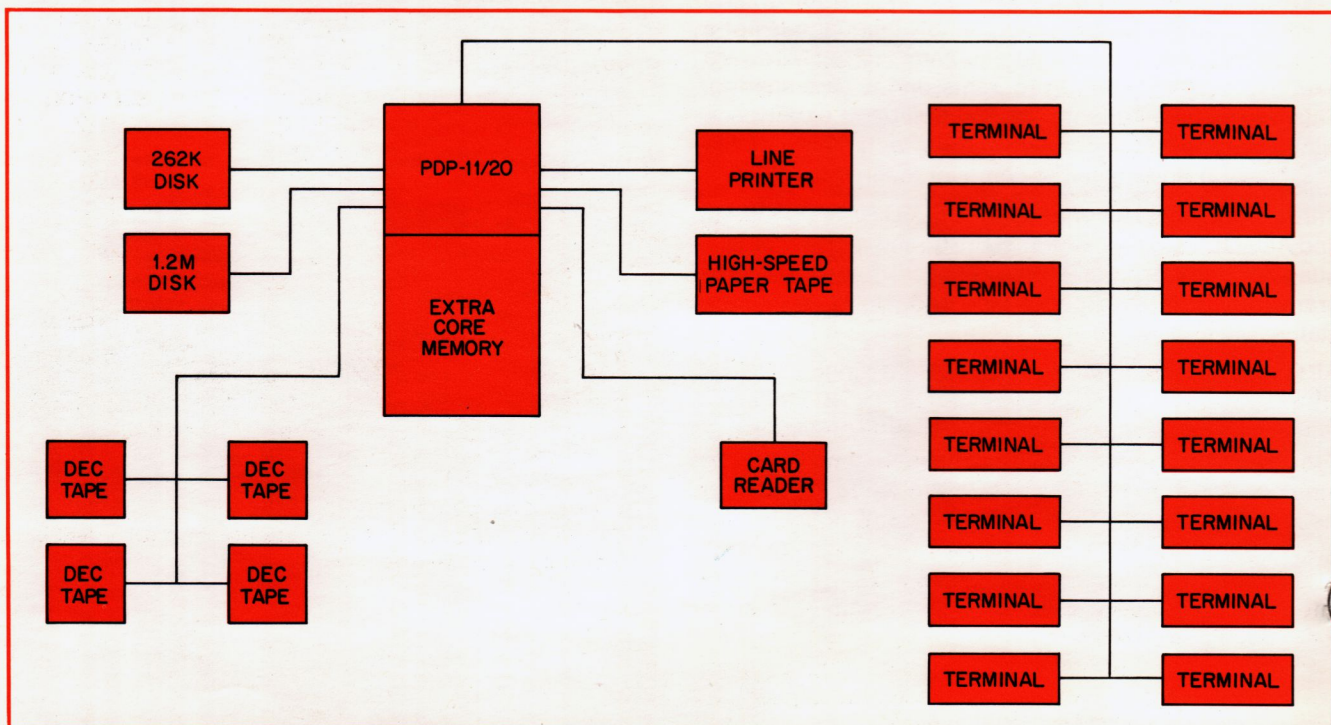
1. High-speed line printer.
2. Additional core memory, disk storage units, or DECtape transports for added system storage capacity.

Environmental Requirements

Recommend control of temperature, humidity, and dust.
Formal computer room not required.

*EduSystem-50 is also available in an 8-user configuration with 16,384 words of core memory and without DECtape transports. All other system components and capabilities remain the same.





EduSystem 80

The first school computer to integrate all system resources, *including peripheral devices*, into a single time-sharing language, BASIC-PLUS. EduSystem 80 means 16-user time-sharing, each with complete access to all system facilities. But the key to the power of the system is BASIC-PLUS: compatible with standard Dartmouth BASIC, but with a unique set of language extensions for advanced programming work.

BASIC-PLUS is the ideal language for beginning computer users. The straight-forward BASIC language structure is easy to learn and easy to remember. The direct, or calculator, mode, lets even nonprogrammers do complex calculations. And complete, explicit, line-by-line error diagnostics point out mistakes immediately.

BASIC-PLUS augments the standard BASIC language structure with powerful string and matrix facilities. Each string is up to 512 characters long. Strings may be concatenated together or extracted from longer strings. Groups of strings may be organized into tables or arrays. The BASIC-PLUS matrix commands allow entire arrays to be input, manipulated, or output with just a single command. Matrix elements may be designated as integers, allowing three times as big a matrix in the same storage space. But no matter if a matrix is too big for core memory. In BASIC-PLUS, matrices may be stored on the disk and paged into core automatically as needed. Array size, therefore, is limited only by disk size.

And BASIC-PLUS includes the most powerful file handling commands of any computer system in its class. Disk files may be random or serial access. Files may also be opened on DECtape, line printer, paper tape reader, and paper tape punch. Up to 12 files may be open to a program simultaneously. This unique *multi-device* file capability makes BASIC-PLUS a true resource sharing language.

Further extensions add still more power to BASIC-PLUS. PRINT USING provides precise output formatting for administrative data processing. (With its line printer capability, complete text handling, and removable tape files, EduSystem 80 is an ideal system for EDP work.)

ALGOL-like constructs such as WHILE, UNTIL, and integer mode greatly expand the capacity of the system for scientific problem solving. And unique system level error handling from within a BASIC-PLUS program itself provides the control necessary for dedicated application packages and simulations.

The simplicity of BASIC without the frustrating limitations of BASIC. That's BASIC-PLUS. A single, well-known language with the variety of language elements needed to serve the total computing needs of a school.

System Components

1. PDP-11 computer with 24,576 words of core memory, 262,000 word high-speed disk, dual DECtape transports and controller, and 16 computer terminals with their associated interfaces.
2. Time-shared BASIC-PLUS Language Processor which includes the following language elements:

HELLO	DIM	INPUT	PI
BYE	RANDOM	INPUT LINE	RND (X)
NEW	IF-THEN	NAME-AS	SGN (X)
OLD	IF-GOTO	KILL	SIN (X)
DELETE	FOR	ON ERROR GOTO	SQR (X)
LIST	FOR-WHILE	RESUME	TAN (X)
LISTNH	FOR-UNTIL	STOP	POS (X)
CONTINUE	NEXT	END	TAB (X)
RUN	DEF	CHAIN	CHR\$ (X)
RUNNH	FNEND	MAT READ	ASCII (A\$)
SAVE	GOTO	MAT PRINT	LEFT (A\$, N)
UNSAVE	ON-GOTO	MAT INPUT	RIGHT (A\$, N)
RENAME	GOSUB	MAT ZER	MID (A\$, N, M)
REPLACE	ON-GOSUB	MAT CON	LEN (A\$)
COMPILE	RETURN	MAT IDN	DAT\$ (X)
LENGTH	CHANGE	ABS (X)	TIME\$ (X)
CATALOG	OPEN	ATN (X)	SLEEP (X)
TAPE	CLOSE	COS (X)	WAIT (X)
KEY	READ	EXP (X)	TRN (X)
ASSIGN	DATA	FIX (X)	INV (X)
DEASSIGN	RESTORE	INT (X)	DET (X)
REM	PRINT	LOG (X)	
LET	PRINT USING	LOG 10 (X)	

Optional Components

1. High-speed line printer
2. Paper-tape reader and punch
3. Additional core memory, disk storage units, or DECtape transports for added system storage capacity.
4. Card reader

Environmental Requirements

Recommend control of temperature, humidity, and dust.
Formal computer room not required.

Education Software Package

The Education Software Package is what makes your EduSystem a complete tool for student instruction, not just a computer. It includes software, textbooks, curriculum materials, and guides for the introduction of the computer into the classroom. Many of these materials have been developed by Digital Equipment Corporation and its users. The rest were assembled in cooperation with leading textbook publishers. Together, they provide your school with the tools to integrate computers into your classes quickly and effectively.

Software

The heart of the EduSystem software package is a BASIC Language Processor. This language processor allows students to write and run programs in the well-known educational language BASIC. Larger EduSystems include the software to handle multiple users simultaneously or to do high-speed processing of programs prepared on mark-sense cards. The user's guide for each system describes the exact capabilities of that system. Each EduSystem also includes a FOCAL Language Processor. FOCAL is a powerful interactive language which was designed specifically for small computers. It is an exceedingly useful adjunct to BASIC, especially for more advanced students. These students may also take advantage of the wide variety of general purpose software which is supplied with each system.

EduSystem User's Guides:

EduSystem 10 System User's Guide

EduSystem 20 System User's Guide (also used for EduSystem 40)

EduSystem 30 System User's Guide (also used for EduSystem 40)

TSS/8 System User's Guide (EduSystem 50)

TSS/8 System Manager's Guide (EduSystem 50)

Programming Texts

The books in this group are used to teach the computer languages BASIC and FOCAL. All are extremely easy to read and use. All seek to have the user write meaningful programs after, at most, studying the first few chapters.

Albrecht, Robert L. *Teach Yourself BASIC*, Tecnica Education Corporation, San Carlos, California, 1970, 128 pages.

A self-teaching workbook which introduces the BASIC Language in a contemporary and interesting fashion. It is an ideal first book for students and teachers. Each works at his own speed. The workbook is designed so that students need only short periods of time at the computer.

Coan, James S. *Basic BASIC, An Introduction to Computer Programming in BASIC Language*, Hayden Book Company, Inc. New York, New York, 1970, 256 pages.

An extremely thorough introductory text with many example programs and student exercises.

This text is suitable for use either as a supplementary text to be incorporated into existing mathematics

courses, or as the text for a course or unit to cover programming alone.

Howland, Howard C. *A FOCAL Primer*, Cornell University Ithaca, New York, 1970, 55 pages.

A step-by-step introduction to the FOCAL language including program hints and student exercises. An appendix, entitled "BASIC for Users of FOCAL" includes a comparison of the two languages.

Computer Mathematics Texts

The books in this group are all textbooks in secondary school mathematics. All, however, assume that students have access to a computer terminal and therefore make regular use of it. The distinctive characteristic of these texts is that they treat the computer as a tool in the study of mathematics, not as an end in itself. They introduce elements of programming only as they are needed for the mathematics being studied.

Albrecht, Robert L., Lindberg, Eric, and Mara, Walter, *Computer Methods in Mathematics*, Addison-Wesley Publishing Company, Menlo Park, California, 1969, 204 pages.

An easily followed introduction to computers and their applications to mathematics. This book contains hundreds of examples and exercises.

Johnson, David C., project director, CAMP: *Computer Assisted Math Program*, Scott Foresman and Company.

A complete set of mathematics texts for grades 7-12. Each textbook makes liberal use of the computer and BASIC programming in the development of the mathematics for that grade.

Each year's student text is accompanied by a complete teacher's commentary which includes information about the content of the CAMP series, practical advice on implementing a computer-assisted math program, and detailed notes on each section of the text. The teacher commentary also includes answers to all exercises.

The books in the CAMP series are:

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CAMP First Course, Teacher's Commentary

CAMP Second Course

CAMP Second Course, Teacher's Commentary

CAMP Algebra

CAMP Algebra, Teacher's Commentary

CAMP Geometry

CAMP Geometry, Teacher's Commentary

CAMP Intermediate Mathematics

CAMP Intermediate Mathematics, Teacher's Commentary

Koetke, Walter, *Computers in the Classroom*, Digital Equipment Corp., Maynard, Mass., 1969, 129 pages.

"This text is intended to serve as a handbook for teachers rather than for students, as demonstration programs, possible assignments for students, (with solutions), and remedial drill programs for students to use are all included. Although the text can be followed page by page, it is primarily intended to be a well-indexed reference work as specific suggestions are made as to

how and where to use the computer within the school's present curriculum." Program examples are worked out using the FOCAL language.

Sage, Edwin R., *Problem Solving with the Computer*, Entelek, Incorporated, Newburyport, Massachusetts, 1969, 244 pages.

Designed to be used in the regular mathematics curriculum, this text emphasizes the computer's ability to teach logical thinking.

Allison, Ronald, *Problems for Computer Mathematics*, Digital Equipment Corp., Maynard, Mass., 1971, 34 pages.

A resource book containing hundreds of suggestions for programming assignments for a class in computer mathematics.

Computer Science Texts

The books in this group are designed to teach the student about computers themselves. Although they describe many of the applications of computers, they concentrate on the computer itself, what it is and how it works.

Southern, Robert, *PDP-8 Programming*, Algonquin College, 1971, 80 pages.

A self-teaching workbook which introduces binary and octal numbering systems, machine language and assembly language programming. The workbook provides an ideal introduction to digital logic, algorithms, and computer science.

Spencer, Donald D., *Fundamentals of Digital Computers*, Howard W. Sams and Co., Inc., Indianapolis, 1969, 256 pages.

A complete introduction to the computer, what it is, what it can do, and what its impact may be on our society. The history of computers, their primary applications, and the way they actually work are all covered. A complete computer system is described component by component.

Introduction to Programming, Digital Equipment Corporation, Maynard, Mass., 1970, 600 pages.

A complete introductory text in the operation and programming of the PDP-8 family computers. Contains a thorough discussion of binary and octal number systems, assembly language programming, and operating systems. An ideal text for more advanced students.

Programming Languages, Digital Equipment Corporation, Maynard, Mass., 1970, 600 pages.

A complete programmer's guide to the languages available for use on a PDP-8 family computer. BASIC, FOCAL, FORTRAN, PAL Assembly Language, and the floating point system are all described. *Programming Languages* is a companion volume to *Introduction to Programming*.

Visual Aids

The Visual Aids package consists of twenty-three (23) viewgraph transparencies designed for use with an overhead projector.

Planned as a teaching aid in the introduction of the BASIC language, each transparency is accompanied by a Teacher's Guide to the use of the viewgraph.

Programs

All the textbooks mentioned above contain large numbers of examples and sample programs. Programs from these books are invaluable to the school which is just getting started with computers. In addition, the Education Software Package includes several volumes which are completely devoted to programs.

BASIC Applications Programs Sets 1-4 Digital Equipment Corp., Maynard, Mass., 1971, 134 pages.

"The programs contained in this series of booklets are designed to demonstrate how the computer can be applied in a meaningful way to problems of many disciplines. The problems and the corresponding programs are, for the most part, quite simple and are designed to be jumping off points for students from the high school level on up."

FOCAL Demonstration Programs, Digital Equipment Corp., Maynard, Mass., 1970.

A large collection of FOCAL programs for application throughout the fields of mathematics and science. The book includes many unique and intriguing computer applications.

BASIC Simulation Programs, Volumes I to VI, Huntington Computer Project and Digital Equipment Corp., 1971.

These volumes include a variety of curriculum programs in the fields of biology, chemistry, earth science, physics, social studies, mathematics and also a collection of teacher aids. For each program there is a complete guide to its use in the classroom (all programs have been used extensively in secondary schools) and a program listing.

Digital Equipment Corporation User's Society [DECUS]

The Education Software Package contains many, but by no means all, of the programs and techniques developed by present EduSystem users. As more and more schools acquire EduSystems, the amount of available material can only increase. To insure a means for the free interchange of these materials among users, Digital supports a user's society, DECUS. Free membership in DECUS goes along with the purchase of any EduSystem. Members may submit any programs which they feel are of general interest. These programs are then available to other users free of charge. DECUS also sponsors special interest groups and holds two conventions each year.

User programs and curriculum materials may also be submitted for publication in Digital's continuing series of *BASIC Applications Programs*, in the education users' newsletter, EDU, or other appropriate Digital publications.

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